



74V1G80

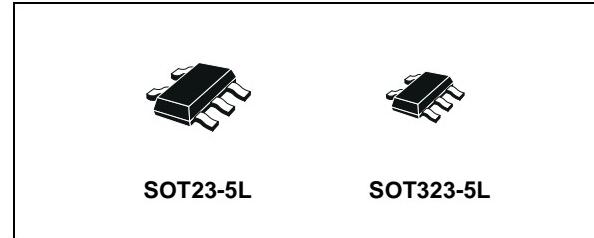
SINGLE POSITIVE EDGE TRIGGERED D-TYPE FLIP-FLOP

- HIGH SPEED:
 $f_{MAX} = 180\text{MHz}$ (TYP.) at $V_{CC} = 5\text{V}$
- LOW POWER DISSIPATION:
 $I_{CC} = 1\mu\text{A}$ (MAX.) at $T_A=25^\circ\text{C}$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\%$ V_{CC} (MIN.)
- POWER DOWN PROTECTION ON INPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 8\text{mA}$ (MIN) at $V_{CC} = 4.5\text{V}$
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \approx t_{PHL}$
- OPERATING VOLTAGE RANGE:
 $V_{CC}(OPR) = 2\text{V}$ to 5.5V
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The 74V1G80 is an advanced high-speed CMOS SINGLE POSITIVE EDGE TRIGGERED D-TYPE FLIP-FLOP WITH INVERTED OUTPUT fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology. It is designed to operate from 2V to 5.5V, making this device ideal for portable applications.

This D-Type flip-flop is controlled by a clock input (CK). On the positive transition of the clock, the Q output will be set to the logic inverted state that was setup at the D input.



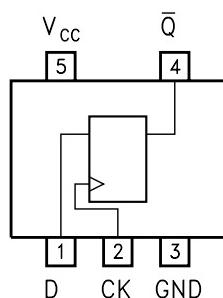
ORDER CODES

PACKAGE	T & R
SOT23-5L	74V1G80STR
SOT323-5L	74V1G80CTR

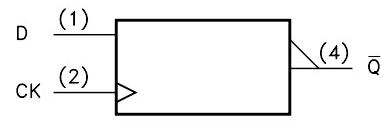
Following the hold time interval, data at the D input can be changed without affecting the level at the output. Power down protection is provided on input and 0 to 7V can be accepted on input with no regard to the supply voltage. This device can be used to interface 5V to 3V.

It's available in the commercial temperature range. All inputs and output are equipped with protection circuits against static discharge, giving them ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS

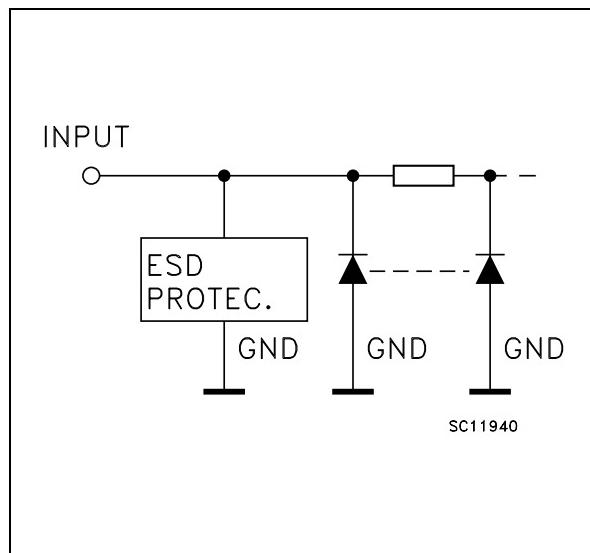


CS03180



CS03190

INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	D	Data Input
2	CK	Clock Input (Positive Edge)
4	\bar{Q}	Inverted Flip-Flop Output
3	GND	Ground (0V)
5	V_{CC}	Positive Supply Voltage

TRUTH TABLE

D	CK	\bar{Q}
L	\square	H
H	\square	L
L	\square	Q_n
H	\square	Q_n

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7.0	V
V_I	DC Input Voltage	-0.5 to +7.0	V
V_O	DC Output Voltage	-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	- 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	°C
T_L	Lead Temperature (10 sec)	260	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	2 to 5.5	V
V_I	Input Voltage	0 to 5.5	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time (note 1) ($V_{CC} = 3.3 \pm 0.3V$) ($V_{CC} = 5.0 \pm 0.5V$)	0 to 100 0 to 20	ns/V ns/V

1) V_{IN} from 30% to 70% of V_{CC}

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value						Unit	
		V _{CC} (V)		T _A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V _{IH}	High Level Input Voltage	2.0		1.5			1.5		1.5		V
		3.0 to 5.5		0.7V _{CC}			0.7V _{CC}		0.7V _{CC}		
V _{IL}	Low Level Input Voltage	2.0				0.5		0.5		0.5	V
		3.0 to 5.5				0.3V _{CC}		0.3V _{CC}		0.3V _{CC}	
V _{OH}	High Level Output Voltage	2.0	I _O =-50 μA	1.9	2.0		1.9		1.9		V
		3.0	I _O =-50 μA	2.9	3.0		2.9		2.9		
		4.5	I _O =-50 μA	4.4	4.5		4.4		4.4		
		3.0	I _O =-4 mA	2.58			2.48		2.4		
		4.5	I _O =-8 mA	3.94			3.8		3.7		
V _{OL}	Low Level Output Voltage	2.0	I _O =50 μA		0.0	0.1		0.1		0.1	V
		3.0	I _O =50 μA		0.0	0.1		0.1		0.1	
		4.5	I _O =50 μA		0.0	0.1		0.1		0.1	
		3.0	I _O =4 mA			0.36		0.44		0.55	
		4.5	I _O =8 mA			0.36		0.44		0.55	
I _I	Input Leakage Current	0 to 5.5	V _I = 5.5V or GND			± 0.1		± 1		± 1	μA
I _{CC}	Quiescent Supply Current	5.5	V _I = V _{CC} or GND			1		10		20	μA

AC ELECTRICAL CHARACTERISTICS (Input t_r = t_f = 3ns)

Symbol	Parameter	Test Condition			Value						Unit	
		V _{CC} (V)	C _L (pF)		T _A = 25°C			-40 to 85°C		-55 to 125°C		
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t _{PLH} t _{PHL}	Propagation Delay Time CK to Q	3.3(*)	15			4.9	8.4	1.0	9.8	1.0	10.8	ns
		3.3(*)	50			5.9	12.0	1.0	14.0	1.0	15.0	
		5.0(**)	15			3.5	5.6	1.0	7.0	1.0	8.0	
		5.0(**)	50			4.5	8.0	1.0	10.0	1.0	11.0	
t _W	CK Pulse Width, HIGH or LOW	3.3(*)			4.0			4.0		4.0		ns
		5.0(**)			3.0			3.0		3.0		
t _s	Setup Time D to CK, HIGH or LOW	3.3(*)			4.0			4.0		4.0		ns
		5.0(**)			3.0			3.0		3.0		
t _h	Hold Time D to CK, HIGH or LOW	3.3(*)			1.0			1.0		1.0		ns
		5.0(**)			1.0			1.0		1.0		
f _{MAX}	Maximum Clock Frequency	3.3(*)	50		100	120		90		90		MHz
		5.0(**)	50		165	180		150		150		

(*) Voltage range is 3.3V ± 0.3V

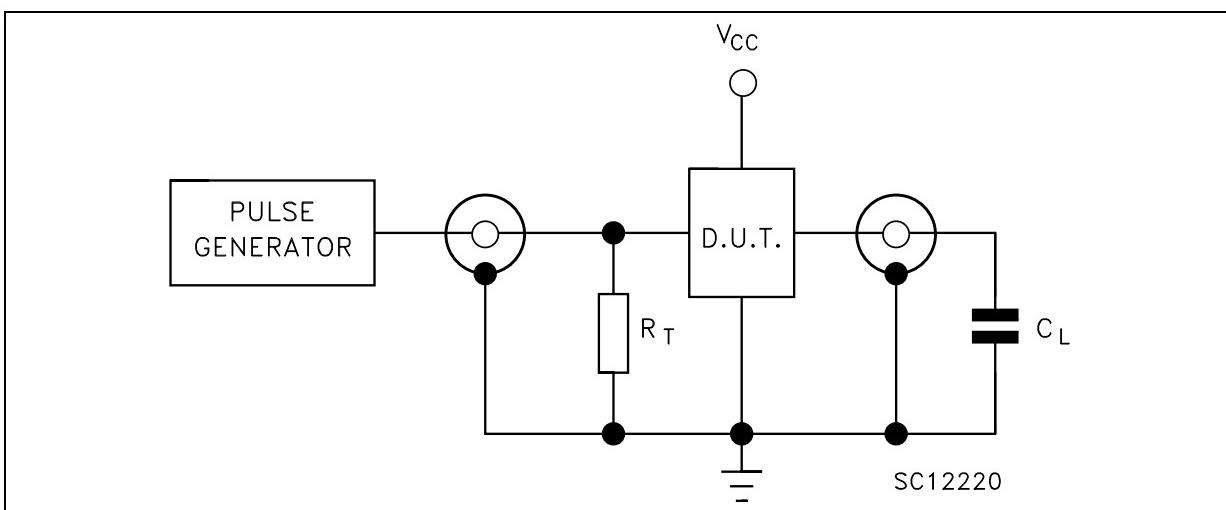
(**) Voltage range is 5.0V ± 0.5V

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition	Value						Unit	
			TA = 25°C			-40 to 85°C		-55 to 125°C		
			Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
C _{IN}	Input Capacitance			4	10		10		10	pF
C _{PD}	Power Dissipation Capacitance (note 1)			8						pF

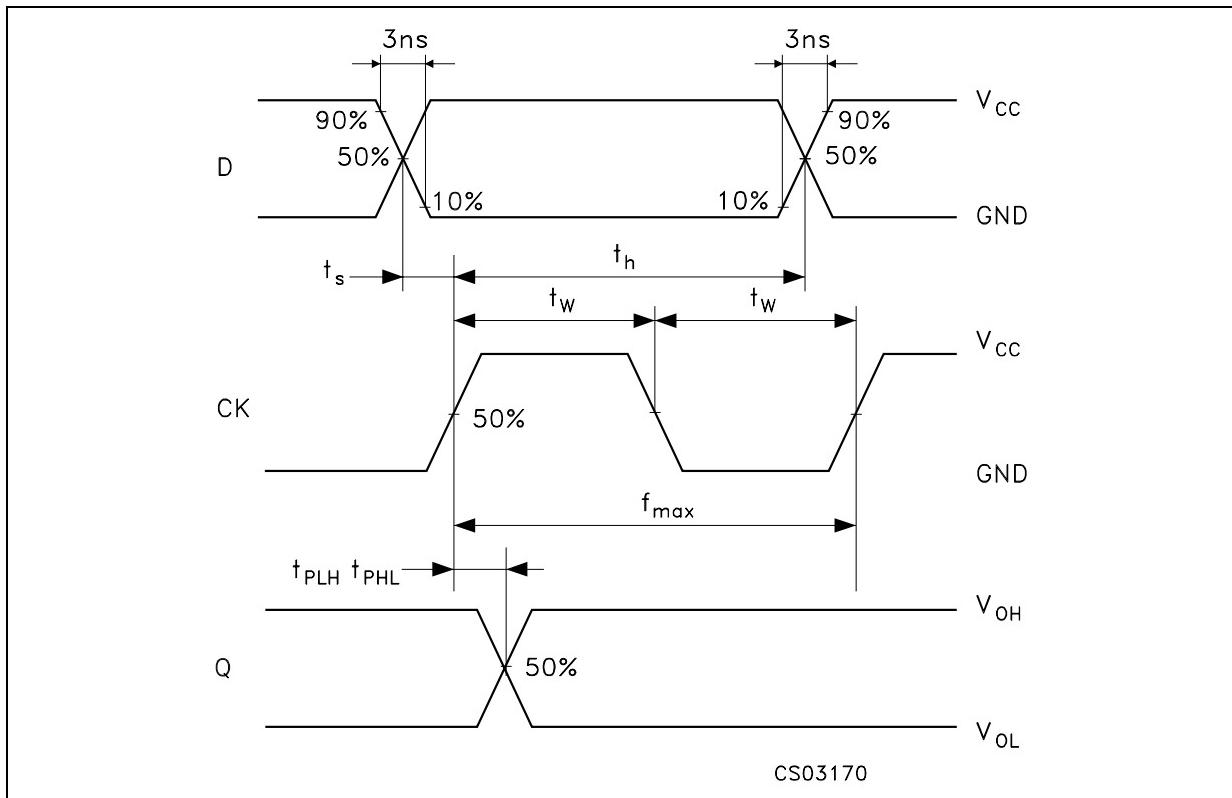
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I_{CC(opr)} = C_{PD} × V_{CC} × f_{IN} + I_{CC}

TEST CIRCUIT

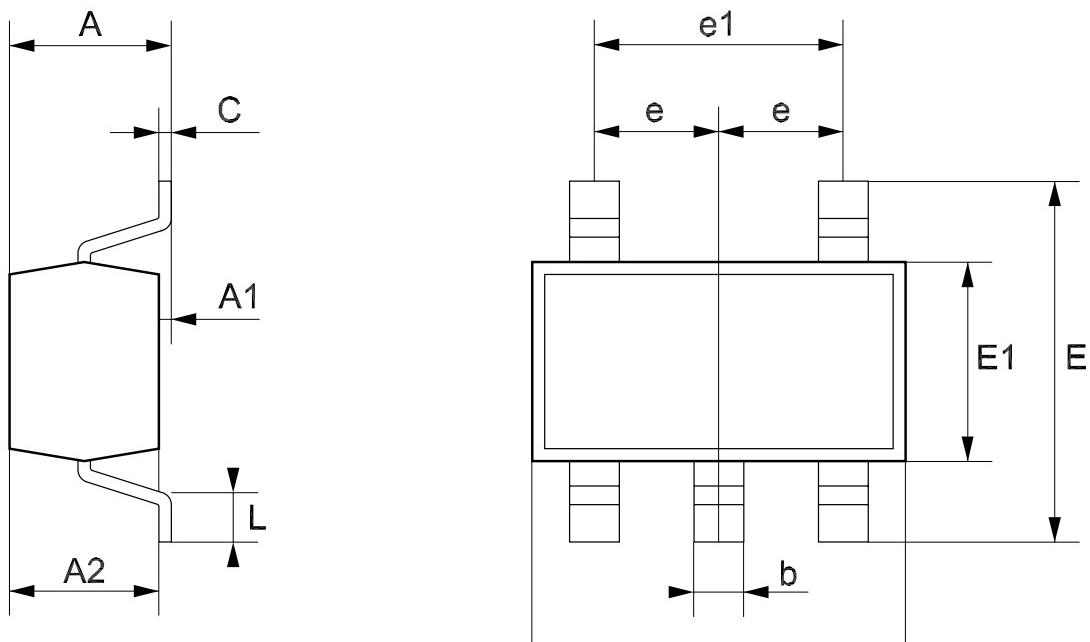


C_L = 15/50pF or equivalent (includes jig and probe capacitance)
R_T = Z_{OUT} of pulse generator (typically 50Ω)

WAVEFORM: PROPAGATION DELAY, SETUP AND HOLD TIMES (f=1MHz; 50% duty cycle)

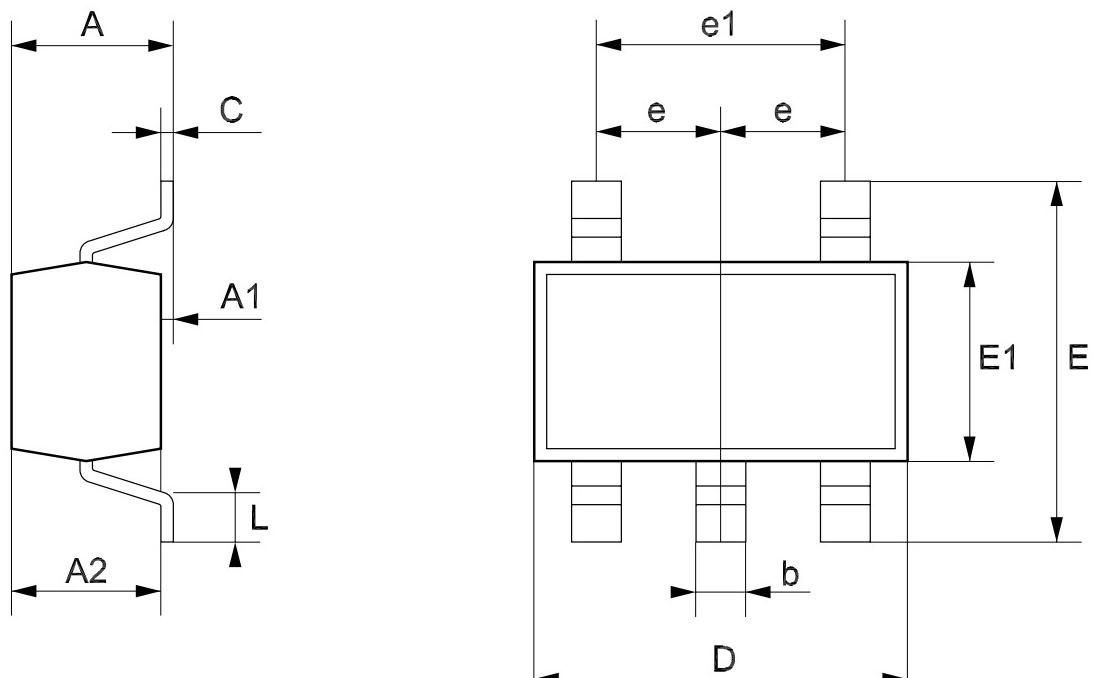


SOT23-5L MECHANICAL DATA						
DIM.	mm.			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.90		1.45	35.4		57.1
A1	0.00		0.15	0.0		5.9
A2	0.90		1.30	35.4		51.2
b	0.35		0.50	13.7		19.7
C	0.09		0.20	3.5		7.8
D	2.80		3.00	110.2		118.1
E	2.60		3.00	102.3		118.1
E1	1.50		1.75	59.0		68.8
e		0.95			37.4	
e1		1.9			74.8	
L	0.35		0.55	13.7		21.6

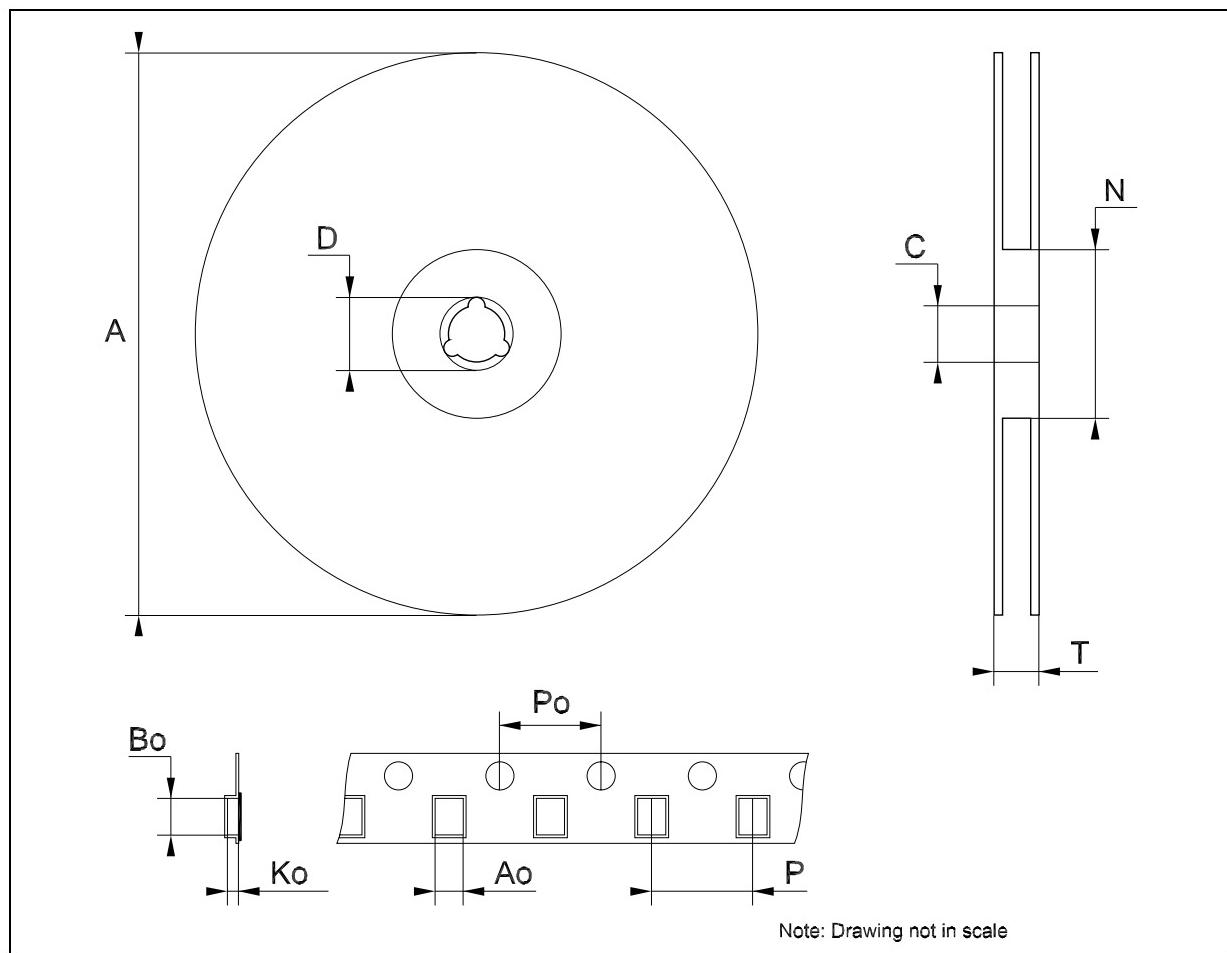


SOT323-5L MECHANICAL DATA						
DIM.	mm.			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.80		1.10	31.5		43.3
A1	0.00		0.10	0.0		3.9
A2	0.80		1.00	31.5		39.4
b	0.15		0.30	5.9		11.8
C	0.10		0.18	3.9		7.1
D	1.80		2.20	70.9		86.6
E	1.80		2.40	70.9		94.5
E1	1.15		1.35	45.3		53.1
e		0.65			25.6	
e1		1.3			51.2	
L	0.10		0.30	3.9		11.8

DIM.	mm.			mils		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	0.80		1.10	31.5		43.3
A1	0.00		0.10	0.0		3.9
A2	0.80		1.00	31.5		39.4
b	0.15		0.30	5.9		11.8
C	0.10		0.18	3.9		7.1
D	1.80		2.20	70.9		86.6
E	1.80		2.40	70.9		94.5
E1	1.15		1.35	45.3		53.1
e		0.65			25.6	
e1		1.3			51.2	
L	0.10		0.30	3.9		11.8

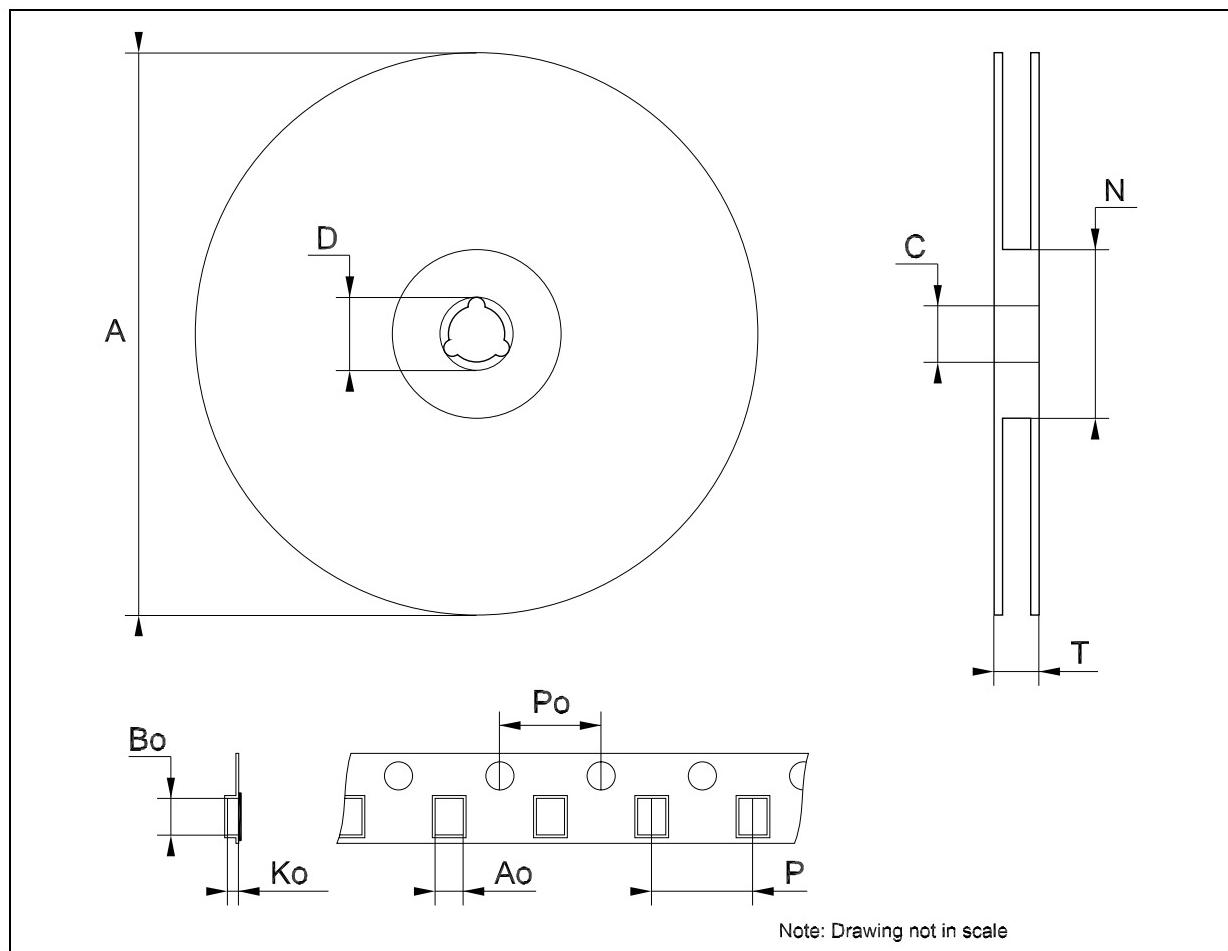


Tape & Reel SOT23-xL MECHANICAL DATA						
DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Bo	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.058
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	3.9	4.0	4.1	0.153	0.157	0.161



Tape & Reel SOT323-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	175	180	185	6.889	7.086	7.283
C	12.8	13	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	59.5	60	60.5		2.362	
T			14.4			0.567
Ao		2.25			0.088	
Bo		2.7			0.106	
Ko		1.2			0.047	
Po	3.98	4	4.2	0.156	0.157	0.165
P	3.98	4	4.2	0.156	0.157	0.165



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